

In re Appln. of Wolfgang Rasp et al.
Serial No. 09/913,118
Reply To Office Action Of June 16, 2005

REMARKS

This Amendment is responsive to the Office Action mailed June 16, 2005 wherein the Examiner rejects Claims 1-10 and 14-25 under 35 U.S.C. § 103(a) as being unpatentable over EP 669,365 in view of Schmidt et al. (US 6,019,831).

Applicants appreciate the Examiner's recognition that EP 669,365 fails to show the claimed species of silicate. However, Applicants respectfully disagree with the Examiner's assertion that it would have been prima facie obvious to one of ordinary skill in the art to use the claimed species of silicate in the polypropylene film applications as shown in EP 669,365. In fact, Applicants submit that EP 669,365, in addition to not showing the claimed species of silicate, does not teach or suggest using the present invention's silicate in films and in fact teaches directly away from a film having a silicate as claimed in the present invention. Furthermore, Applicants disagree with the Examiner's use of Schmidt as further evidence of the obviousness to select the claimed silicate species and respectfully submit that Schmidt does not teach, suggest or disclose the present invention. Applicants further submit that there is no motivation to combine the references, and even when the references are combined, the references do not disclose, teach or suggest the claimed invention. Applicants respectfully submit that the pending claims, in view of these remarks, and new Claim 26 are in a condition for allowance.

Summary of the Invention

The present invention is directed to a laser-markable, transparent, oriented polypropylene film and method of forming thereof. As defined in Claim 1, the film includes at least one layer

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including a layered dry-ground silicate having an irregular surface structure and without a coating of metal oxides. The layered silicate is between 0.01% to 4% by weight, based on the total weight of the film. The film is at least 85% by weight polypropylene and wherein the film is laser markable.

The film generally includes at least 85% by weight, preferably from 90 to less than 100% by weight and more preferably from 98% to less than 100% by weight of a polyolefin, such as the claimed polypropylene. The polypropylene is highly isotactic, with isotacticity index of the n-heptane insoluble content of the polypropylene of at least 95%, preferably from 96% to 99%.

It is essential to the invention that at least one layer of the film includes a pigment based layered silicate or layered silicates which has an irregular surface structure and no coating of metal oxides. This pigmented layer generally includes pigments in an amount of 0.01% to 4% by weight, preferably from 0.5% to 2.5% by weight, and in particular from 0.8% to 1.5% by weight, based on the total weight of the film. It is therefore preferred for the pigment concentration per area unit of the film to be in the range from 0.1 to 1.0g/m², preferably from 0.1 to .7 g/m², in particular from 0.10 to 0.30 g/m². This area concentration is sufficient to ensure that the laser beam cannot pass through the film unhindered, but instead hits a pigment particle in the pigmented layer. The range for the area concentration applies irrespective of the film thickness, the layer thickness and the number of layers.

The layered silicate-based pigments are prepared from layered silicates having a platelet-shaped structure, such as micas, which are known in the art for the preparation of pearlescent pigments. The surface structure of the pigments is modified through a dry grinding process, so

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that the originally smooth surface structure of the layered silicates is substantially destroyed, i.e. that the dry-ground pigments have a rough surface structure. However, the platelet-shaped character of the pigment structure is retained to a certain extent in the process. Unlike the prior art, the pigments are not provided with a coating of metal oxides or metal oxide hydrates to obtain high hiding power and high color intensity. Unexpectedly it has been found that the pigments that are not coated with metal oxides or metal oxide hydrates are advantageous since the laser marking is in the form of a white mark on a transparent film and is more readily visible due to the film being more transparent and less hazy through the use of an uncoated pigment. In addition, the transparency of the oriented film comprising uncoated pigments is surprisingly retained with virtually no change. In comparison, coated layered silicates (such as the titanium dioxide used in the cited reference) cause the film to become very hazy. Therefore, it has unexpectedly been found that the grinding for the production of rough surfaces, but with no coating of metal oxides, is essential in order to achieve a transparent, laser-markable, oriented film.

As defined in Claim 24, the present invention is directed to a method of marking a polypropylene film through forming an oriented polypropylene film comprising at least one layer having dry-ground silicate without a coating of metal oxides, which has an irregular surface, wherein the amount of the layered silicate is between 0.01 to 4% by weight, based on the total weight of the film. The film is marked by a laser selected from the group consisting of a CO₂ laser, an Nd:YAG laser and an excimer laser.

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As defined in Claim 25, the present invention is directed to a method for forming and applying a marketed polypropylene film to a package, the method comprising the steps of forming an oriented polypropylene film, marking the oriented polypropylene film with a laser selected from the group consisting of a CO₂ laser, an Nd:YAG laser and an excimer laser, and applying the formed oriented polypropylene film to the package. The film comprising at least one layer having dry-ground silicate without a coating of metal oxides, which has an irregular surface, wherein the amount of the layered silicate is between 0.01 to 4% by weight, based on the total weight of the film.

EP 669,365 and U.S. 6,019,831

The Examiner rejected the pending claims under 35 U.S.C. Section 103(a) as being unpatentable over European Patent Application No. 669,365 (the "cited reference"), taken in view of U.S. Patent No. 6,019,831 to Schmidt et al ("Schmidt"). More specifically the Examiner has rejected the claims as being prima facie obvious in view of the cited reference. The Schmidt patent has been supplied by the Examiner as further evidence of the obviousness to select the claimed silicate. In view of the following remarks, Applicants respectfully traverse this rejection as conceivably applied to the pending claims.

The cited reference is directed to a polyolefin resin-based marking composition capable of developing a vivid color in dark brown to black on irradiation with laser beams, moldings of the composition and a laser marking method (Abstract & Field of Invention).

The cited reference states that in order to solve the listed problems, when a laser marking method is applied on polyolefin resin molded articles, many heavy metal compounds

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are used, but their scope is limited since these compounds have iridescent luster although not tinted, they may develop a foreign color tone when applied to an article for which no pearly luster is needed (Pg. 2, Lns. 25-36). More specifically, the cited reference refers to another reference that proposes use of pearlescent pigments as non-tinted compounds, but the cited reference states that since these compounds have iridescent luster although not tinted, they may develop a foreign color tone when applied to an article for which no pearly luster is needed (Pg. 2, Lns. 33-36). Even as a color former, there is no completely colorless one (Pg. 2, Ln. 37). Therefore, there are such problems that if the amount of color former increases, the products to be marked are influenced in hue and color tone, the viscosity of the resin composition increases and the resin composition is influenced in its moldability, the abrasion property increases and the molding machine and kneader are injured by the abrasion at the molding. (Pg. 2, Lns. 37-41). Accordingly, even if the color former itself is colorless and its amount to be used is a very little, **a marking composition to be colored in clear dark brown to black by laser beam is required** (Pg. 2, Lns. 41-42).

In the cited reference, the compound used acts as a color former, especially a color former **developing dark brown to black in laser marking** (Pg. 3, Lns. 44-45). The composition develops a dark brown color, but **when titanium dioxide is added**, the reddish tinge of the dark brown color is eliminated to present a gray to black color, enhancing the vividness of the formed mark (Pg. 4, Lns. 25-27). Any of the commercial products of titanium dioxide can be used, but when no transparency of the mark is required and development of a black color is desired, it is recommended to use the type of titanium dioxide which is

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commercially sold as a pigment material, and when it is desired to form a grayish color while maintaining the transparency of the mark, it is recommended to use particulate titanium dioxide (Pg. 4, Lns. 27-31). When a laser beam is applied to the surface of a two-dimensional or three-dimensional molding, such as mentioned above, a dark brown to black mark with a vivid contrast is formed at the irradiated portion (Pg. 5, Lns. 51-52).

In the prelude to the Examples, the cited reference states that \odot indicates that a dark brown or black mark with excellent vividness was obtained, O indicates that a dark brown or black mark with good vividness was obtained, and X indicates that the vividness of the mark was bad or there was merely obtained a white mark (Pg. 6, Lns. 15-17). The cited reference also describes the preparation of the Referential Example, which is the colorant used in the Examples. 100 ml of glass beads (1 mm ϕ), 100 g of mica (Kuralite mica 600W produced by Kuraray Co., Ltd.; average particle size: 8 μ) and 186 g of ethyl alcohol were supplied and treated in a 500 ml ceramic sand mill for 8 hours. Then the glass beads were filtered out, ethyl alcohol was removed by evaporation under reduced pressure and the resultant product was dried to obtain 99 g of particulate mica having an average particle size of 2 μ . (Pg. 6, Lns 21-25).

It is well settled that under 35 U.S.C. § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Graham v. John Deere Co., Calmar v. Cook Chem. Co., 383 U.S. 1, 17 148 USPQ 459 (1966). It is also well settled that in applying 35 U.S.C. § 103 that hindsight may not be used. Dennison Mfg. Co. v. Panduit Corp., 475 U.S. 809, 229 USPQ 478 (1986). When the issue is nonobviousness under Section 103, the

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sources are examined to determine what they teach to a person with ordinary skill in the pertinent art as to the obviousness of the invention, and each prior art reference must be evaluated as an entirety. In re Sernaker, 702 F.2d 989, 217 USPQ 1 (Fed. Cir. 1983). Obviousness must be established by consideration of the prior art, as well as the claimed invention, as a whole. Polaroid Corp v. Eastman Kodak Co., 641 F. Supp. 828, 853, 228 USPQ 305, 324 (D. Mass. 1985). The reference must do more than suggest that an innovation ought to be tried or is obvious in hindsight. Id.

It is also well established that what otherwise might be viewed as an obvious modification of the prior art will not be deemed obvious in patent law sense when one the prior art references teach away from the invention. In re Wright, 866 F.2d 422, 9 USPQ2d 1649 (Fed. Cir. 1989). A reference may be said to teach away when a person of ordinary skill, upon reading the reference would be led in a direction divergent from the path that was taken by the Applicant. Tec Air, Inc. v. Denso Mfg. Mich, Inc., 192 F.3d 1353, 1360, 52 USPQ2d 1294, 1298 (Fed. Cir. 1999). Furthermore, a reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the Applicant or if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the Applicant. In re Gurley, 27 F.3d 551, 553, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994); See also United States v. Adams, 383 U.S. 39, 52, 148 USPQ 479, 484 (1966). An Applicant can rebut prima facie obviousness of a claimed invention created by a prior art reference by establishing (1) the existence of unexpected properties, or (2)

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that the art in any material respect taught away from the claimed invention. In re Malagari, 399 F.2d 1297, 1303, 182 USPQ at 549, 533 (CCPA 1974). To establish a prima facie case of obviousness, it is necessary for the Examiner to present evidence, preferably in the form of some teaching, suggestion, incentive or inference in the applied prior art, or in the form of generally available knowledge, that one having ordinary skill in art *would have been led* to arrive at the claimed invention. Ex parte Levengood, 28 USPQ2d 1300, 1301 (Bd. Pat. App. & Int'f 1993).

Applicants respectfully disagree that it would have been prima facie obvious to one of ordinary skill in the art to use the claimed species of silicate in the polypropylene film applications as shown in EP 669,365. Applicants submit, that in contradiction to well established case law, the Examiner is using hindsight and the present invention as a roadmap to state that the claimed species of silicate is prima facie obvious in view of the cited reference. Applicants further submit, that the cited reference actually instead teaches away from the present invention, further contradicting the Examiner's statement that the claimed species of silicate is prima facie obvious in view of the cited reference (Applicants have addressed further below the Examiner's use of Schmidt as further evidence of the obviousness to select the claimed silicate). As stated above in the case law, the Examiner must consider the reference in its entirety and the claimed invention as a whole. Furthermore, Applicants remind the Examiner that in view of the case law above, the reference must do more than suggest an innovation ought to be tried or is obvious in hindsight, and, Applicants respectfully submit that in the cited reference does not even suggest the present invention ought to be tried, but instead teaches away. Furthermore, as

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stated in the case law, a reference teaches away when one skilled in the art would be lead in a direction divergent from the path that was taken by the Applicant.

The cited reference does not include the claimed silicate, as agreed by the Examiner, and the cited reference teaches directly away from the present film, which as provided in the specification of the present invention, gives a white mark not a brown or black mark. Applicants do not understand how any reference can more clearly teach away, when the cited reference specifically states "a marking composition to be colored in clear dark brown to black by laser beam IS REQUIRED" (emphasis added). Every teaching in the reference is directed to obtaining a black/brown mark and when the present invention, as claimed, gives a white mark. Furthermore, as stated above, any mention within the cited reference to a white mark, was deemed unacceptable and in the category of no mark at all (in addition to the cited reference not teaching the claimed silicate – as agreed by the Examiner).

Even if one skilled in the art would read the reference in a desire to obtain a white mark, they would be led to use the mica used in Comparative Example 1 or the talc in Comparatives Example 3, which provides a white mark. These teachings of a white mark, are directly opposite the present inventions silicate (as agreed by the Examiner-that the invention does not show the claimed silicate) and one skilled in the art, searching for a substance to make a white mark, would find two examples (ignoring the fact that the reference teaches away from white marks) and would be lead to use these examples, with no reasons to substitute the present invention silicate and furthermore, even if these were not desirable as white marks, there would be no motivation and the one skilled in the art would not be lead by the teachings of the cited

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reference to obtain the silicate of the present invention. Therefore, in view of the disclosure of a white mark, which is clearly not using the silicate of the present invention, Applicants submit that one skilled in the art would have been led to use the formulated examples, and not substitute silicates such that the silicate of the present invention would not be prima facie obvious. Applicants submit that a reference could not more clearly teach away from an invention than the cited reference teaches away from the present invention. Therefore, Applicants cannot understand how the Examiner can even consider it to be prima facie obvious to use the claimed silicate, when the cited reference is clearly directed to making a dark brown/black mark, and the two examples it does give of a white mark are clearly not the silicate of the present invention, and there is no motivation, or teachings regarding the silicate of the present invention as claimed in the independent claims. This disclosure of a white mark, that does not use the silicate of the present invention, clearly satisfies case law, that silicate of the present invention cannot be prima facie obvious, because it clearly leads one skilled in the art in a direction divergent from the Applicants silicate. As stated in the case law, Applicant can rebut prima facie obviousness by teachings away from the present invention. Applicants respectfully submit that in the cited reference, the teachings away could not be any more clear.

The type of silicate used would directly teach away from using the silicate of the present invention, as the silicate in the cited reference is not (1) dry-ground, (2) without a coating of metal oxides, and (3) of an irregular surface structure. Furthermore, as claimed in Claim 2, the silicate in the cited reference is not platelet-shaped. Therefore, it is not prima-facie obvious to use the present invention's silicate in that not only is there (1) no mention of the present

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invention silicate, (2) no teachings of silicates having properties similar to or the same as the properties of the silicate in the present invention, but also (3) teaching away in the cited reference from the silicate of the present invention and no motivation for one skilled in the art to use the silicate of the present invention. Nothing in the cited reference would lead one skilled in the art to arrive at the claimed invention, and the two examples of a white mark further support this, and therefore, in accordance with the cited case law, the pending independent and dependent claims are in a condition for allowance.

The cited reference specifically teaches the use of metal oxides, when the present invention specifically uses silicates that are without a coating of metal oxides. Therefore, the cited reference teaches away from the present invention.

Therefore, in summary, Applicants respectfully submit that the Examiner is using hindsight, in opposition to case law. Furthermore, as discussed above, the cited reference does not teach the claimed silicate (which the Examiner admits), and Applicants submit that the cited reference clearly teaches away from the claimed silicate. Therefore, the Examiner is clearly using the present invention as a roadmap and in hindsight to get the claimed invention from the cited reference. Applicants submit to the Examiner the question of how can the film of the present invention, including such a different silicate, be prima facie obvious, when everything in the cited reference teaches away from the silicate used in the film of the present invention.

Applicants also respectfully submit that Schmidt does not support the Examiner's conclusion that the selection of the silicate used in the present invention is prima facie obvious. Schmidt is directed to non-lustrous iron oxide containing color pigments based on dry-milled

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inorganic platelet like substrates (abstract). In the background of the invention, Schmidt states that pearl luster pigments are based on platelet-shaped substrates, in particular those made of mica, which are covered with one or more layers of one or more metal oxides. Furthermore, Schmidt states that the invention also relates to processes for preparing pigments and to the use of pigments in plastics, paints and coatings, printing formulations and cosmetic preparations. No mention is made of films. There is clearly no motivation in combining Schmidt with the cited reference.

In addition to the lack of motivation in combining Schmidt with the cited reference, in Col. 2, Lns 50-55, Schmidt states that "It has now surprisingly been found that dry-milled inorganic platelet-shaped substrate particles have substantially lost their original platelet form and no gloss is to be observed." Thus, dry-milling muscovite mica gives a white powder which essentially consists of irregularly shaped particles and has no gloss. Therefore, Schmidt teaches directly away from the claimed "platelet shaped" structure in Claim 2.

The Examiner has also mischaracterized the language of Schmidt. Schmidt states that "for coating, it is particularly preferred to apply colored or colorless metal oxides/hydroxides or metal oxide hydrates". (Col. 4, Lns. 34-35). The metal oxide layers are preferably applied by wet chemical methods. In wet coating, the dry-milled particles are preferably suspended in water, and the metal oxides are directly deposited on the particles without any secondary precipitations taking place. (Col. 4, Lns 50-66). "Particular preference is given to particles coated with titanium dioxide and/or iron oxide" (Col. 5, Lns 15-16). Therefore, it is not an "optional coating" as stated by the Examiner, but a coating of particular preference which means

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that Schmidt directly teaches away from silicates without metal coatings. Schmidt does make one mention of organic components by stating that "strongly adhering inorganic or organic colorants are distinguished" (Col. 4, Lns 23-25). However, the Applicants can find no other mention in Schmidt regarding the use of organic components, no mention of acceptable organic components, no teachings of substitutions or how to substitute organic coatings for inorganic coatings, and furthermore, no teachings or examples showing organic components. Therefore, in view of the particular preference to metal oxides, the examples that only use inorganic coatings, and other teachings, Applicants respectfully submit that Schmidt teaches the use of inorganic coatings, with particular preference to metal oxide coatings, and that the single mention of organic colorants, with no further support or mention elsewhere in Schmidt does not overcome the other pervasive teachings of Schmidt. Therefore, Schmidt still teaches away from the present invention and the use of silicates without metal oxide coatings. Furthermore, in view of the above, one skilled in the art would be not be motivated to make the substitutions of silicates and coatings as suggested by the Examiner and therefore, Schmidt does not support the Examiner's proposition that the present invention's silicate is prima facie obvious, but in actuality supports directly the opposite and Applicants position that a silicate without a coating of metal oxides is novel.

Furthermore, it is very important to note that Schmidt is directed to two clearly separate embodiments. In the first embodiment, which starts following the description of the drawings and extends through Col. 9, Ln. 3, there is no mention of films, no mention of laser marking, and much less no mention of a film being laser markable, especially a film as claimed in the

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present invention. The first embodiment is discussed above and contains the only mention of "organic colorants". In view of the clear demarcation between the embodiments, Applicants submit that the mere mention of laser markable in the second embodiment does not provide support for the combination of the references or support for the Examiner's position that the term "organic" supports the prima facie obviousness of selecting the present invention's silicate for use in a laser marking film.

In the second embodiment, Schmidt is directed to a non-lustrous iron oxide containing color pigments based on dry-milled inorganic platelet like substrates. (Col. 9, Lns 4-9). The invention in Schmidt, specifically the second embodiment, is related to iron oxide-containing color pigments, and a process for the preparation of the pigments. In regards to the second embodiment, Schmidt states that "Plastics which comprise the pigments of the invention (*i.e.*, the second embodiment), are in addition, suitable for laser marking." (emphasis added Col. 11, Lns 66-67). Therefore, Schmidt has clearly defined that the second embodiment is laser markable, over the first embodiment, which made no mention of laser marking. The addition of the color pigments in concentrations ...give high-contrast and high definition laser markings. (Col 11, Ln. 67 – Col. 12, Ln. 8). Therefore, the second embodiment in Schmidt is directed to pigments which are in addition laser markable and it is important to note that they have been specifically limited to metal oxide pigments. This supports Applicants position that Schmidt directly teaches away from a laser markable film using the silicate of the present invention which are without metal oxide coatings.

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Therefore, in view of these remarks and the cited case law, Applicants have rebutted the prima facie obviousness asserted by the Examiner. The dependent claims provide additional limitations and therefore are additionally allowable over the independent claims. New Claim 26 provides additional limitations that are further allowable over the prior art.

In view of the above remarks, Applicant respectfully submits that all of the pending claims are in a condition for allowance. If the Examiner believes that personal communication will expedite prosecution of this application, he is invited to telephone the undersigned at (248) 433-7231.

Prompt and favorable consideration of this amendment is respectfully requested.

Respectfully submitted,

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By 
Craig A. Phillips
Reg. No. 47,858
Attorney For Applicants

DICKINSON WRIGHT PLLC
1901 L Street NW, Suite 800
Washington, D.C. 20036
(248) 433-7231

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